

Serial No. 09/451,108
Amdt dated December 22, 2003
Office Action dated July 29, 2003

Docket No. K-0119

REMARKS

Claims 1-9, 11, 13-15, 17-20, and 22 are pending in this application. By this Reply, claims 1, 11, 17, 18, and 22 are amended, and claims 12 and 21 are cancelled. Reconsideration and withdrawal of the rejections are respectfully requested in view the foregoing amendments and the following remarks.

Entry of the amended claims is proper under 37 C.F.R. 1.116 since the amendments: (1) place the application in condition for allowance (for the reasons discussed herein); (2) do not raise any new issues requiring further search and/or consideration (since the amendments amplify issues previously discussed throughout prosecution without incorporating additional subject matter); (3) satisfy a requirement of form asserted in the previous Office Action; and/or (4) place the application in better form for appeal (if necessary). Entry is thus requested.

Applicant acknowledges with appreciation the indication of allowability of claims 15 and 19, and the indication of allowable subject matter in claims 17 and 18.

Claims 17, 18, and 22 stand rejected under 35 U.S.C. § 112, second paragraph. These claims have been amended, and are believed to comply with the requirements of Section 112. Withdrawal of this rejection is respectfully requested.

Claims 1-9, 11-14, and 20 stand rejected under 35 U.S.C. § 103(a) over Santos et al. (U.S. Patent No. 5,119,399) (hereinafter Santos). Additionally, referring to paragraph 21 of the Office Action, it is believed that this rejection applies to claim 22 as well. This rejection is respectfully traversed.

Santos fails to establish a prima facie case of obviousness, as required by Section 103. For example, Santos fails to teach or suggest at least a first amplitude invariant phase shifter to shift a phase of an input signal, a coupler to separate an output of the first amplitude invariant phase shifter into first and second channel signals, a second amplitude invariant phase shifter to shift a phase of the first channel signal, a third amplitude invariant phase shifter to shift a phase of the second channel signal, and a combiner that receives and combines signals from the second and third invariant phase shifters and provides an output, wherein the first, second, and third amplitude invariant phase shifters respectively shift within first, second, and third prescribed shifting ranges, as recited in amended claim 1.

Moreover, Santos fails to teach or suggest at least a first amplitude invariant phase shifter for shifting a phase of a received signal at prescribed intervals within a phase shifting range of approximately $0^{\circ}\sim 360^{\circ}$, a quadrature hybrid coupler for separating an output of the first amplitude invariant phase shifter into I and Q channel signals shifted substantially 90° in phase relative to each other, a second amplitude invariant phase shifter for shifting a phase of the I channel signal by a first amplitude within a phase shifting range of approximately $0^{\circ}\sim 90^{\circ}$, a third amplitude invariant phase shifter for shifting a phase of the Q channel signal by a second amplitude within a phase shifting range of approximately $0^{\circ}\sim 90^{\circ}$, and a combiner for receiving signals from the second and third amplitude invariant phase shifters and calculating a vector sum thereof, wherein the first, second, and third amplitude invariant phase shifters respectively shift within first, second, and third prescribed shifting ranges, as recited in claim 13.

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Santos relates to a method and apparatus for calibration of a vector modulator. Referring to Figure 1, Santos teaches that the vector modulator 11 includes local oscillator 13 to produce a carrier frequency. A carrier frequency is provided to a signal splitter module 15, that reproduces the original carrier signal ($I_c(t)$) at a first output terminal and a 90° shifted carrier signal ($Q_c(t)$) at a second output terminal. Hence, the signal splitter produces the I signal and the Q signal. Signal I_c is provided to a first phase shifter 17 and signal Q_c is provided to a second phase shifter. These two signals are combined at sum module 25.

Applicant notes that the Office Action asserts that Santos teaches a first phase shifter, citing the signal splitter module 15 of Figure 1. Moreover, the Office Action asserts that the second and third phase shifters are taught by Santos as phase shifter 17 and phase shifter 21. Assuming, *arguendo*, the accuracy of this assertion, Applicant notes that Santos must then fail to teach or suggest a coupler to separate the first channel signal into an I channel signal and a Q channel signal. Alternatively, assuming that Santos teaches the I/Q coupler (for example, element 15 of Figure 1), then Santos therefore must fail to teach or suggest first, second, and third amplitude invariant phase shifters.

Moreover, Santos specifically teaches that the signal splitter module 15 splits the input signal from the local oscillator 13 into an I signal and a Q signal. Additionally, the first phase shifter 17 operates on the first channel, and the second phase shifter 21 operates on the second channel. However, there is no teaching or suggestion of a first amplitude invariant phase shifter.

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Consequently, Santos fails to teach or suggest all of the claimed features. Claims 2-9, 11, 12, and 20 depend from claim 1, and claims 14 and 22 depend from claim 13. These claims are allowable for at least the reasons discussed above with respect to the corresponding independent claims. Because a prima facie case of obviousness cannot be made, withdrawal of this rejection is respectfully requested.

CONCLUSION

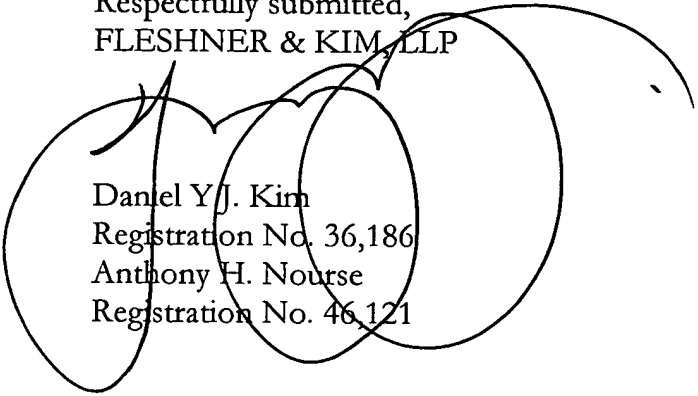
In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **Daniel Y.J. Kim** at the telephone number listed below.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
FLESHNER & KIM, LLP



Daniel Y.J. Kim
Registration No. 36,186
Anthony H. Nourse
Registration No. 46,121

P.O. Box 221200
Chantilly, VA 20153-1200
703 502-9440 DYK/AHN:cre
Date: December 22, 2003

Please direct all correspondence to Customer Number 34610